

60. A plasma etching apparatus according to claim 57, wherein the film formed on the detachable member is formed to a thickness of about 200 microns.

61. A plasma etching apparatus according to claim 60, wherein the thermally conductive medium is circulated so as to control the temperature of the surface of the detachable member in a range of 0 to 50°C.--

REMARKS

By the above amendment in this RCE, the cross reference to related application has been clarified, claims 21-51 have been canceled, and new claims 52-61 reciting additional features not previously recited in the claims under final rejection in the Office Action dated December 6, 2002, have been presented. More particularly, new independent claim 52 recites the feature of a power source for supplying the high frequency wave to the sample holder, and that the etching chamber is at least partially constituted by a sidewall which is grounded to earth, which would have raised new issues, which features were not previously recited. As illustrated in Fig. 1 of the drawings, for example, a lower electrode 130 loads and holds a sample W such as a wafer on the top thereof, and the lower electrode is connected to a bias power source 141 for supplying the bias power within a range from 400 kHz to 13.56 MHz via a filter system 142. Further, as illustrated, the sidewall 102 is connected with the member 105 and is thereby grounded to earth. Further, as described, a detachable member 102 in the form of a detachable jacket which is held against the sidewall, as illustrated in Figs. 1, 6, and 7 and described at page 33 of the specification, for example. Thus, it is apparent that the newly recited features are supported in the application disclosure.

Applicants note that claim 52 further defines the feature that a processing gas is supplied inside of an etching chamber and a sample which is placed on a sample

holder disposed inside of the etching chamber is processed by a plasma generated in the etching chamber, the detachable member being detachably held against the sidewall inside of the etching chamber and forming the inner surface of the etching chamber which is in contact with the plasma generated in the etching chamber, the detachable member being removable from the sidewall to outside of the etching chamber, and a thermally conductive medium being circulated inside of the detachable member so as to control temperature of the detachable member within a predetermined range, wherein products formed in the etching chamber are deposited on the detachable member. Applicants submit that such features as recited in claim 52 and the dependent claims 53-61 are not disclosed or taught in the cited art, as will become clear from the following discussion.

Applicants note that the rejection of claims 21-25 and 27-37 under 35 U.S.C. 103(a) as being unpatentable over Goto et al, U.S. Patent 5,843,277 in view of Hanaguri, JP 1-208499; the rejection of claims 21-25 and 27-37 under 35 U.S.C. 103(a) as being unpatentable over Hanaguri, JP 1-208499A in view of Goto et al, U.S. Patent 5,843,277; the rejection of claims 21-25 and 27-37 under 35 U.S.C. 103(a) as being unpatentable over Shinji, JP 09-275092 in view of Goto et al, U.S. Patent 5,843,277; and the rejection of claims 21-25 and 27-37 under 35 U.S.C. 103(a) as being unpatentable over Shinichiro, JP 63-005526A in view of Goto et al, U.S. Patent 5,843,277; such rejections are traversed insofar as they are applicable to the present claims, and reconsideration and withdrawal of the rejections are respectfully requested.

Applicants note that in accordance with the structural arrangement as now recited in claim 52 and the dependent claims, by having the wall which constitutes a part of the etching chamber being grounded to earth, a portion of the wall functions as an electrode and plasma particles of the plasma generated in the etching chamber are attracted to and collide against the portion on the inner surface of the

etching chamber which is formed by the detachable member held against the sidewall and which is in contact with the plasma so that a greater interaction is generated with respect to the cited art. Furthermore, as described in the specification, the interaction becomes more sensitive as the temperature increases to increase the effect on the process. Thus, when the wall surface is heated to higher temperatures because of the processing in the etching chamber, deposited products peel off from the etching chamber wall which interaction increases with elevation of temperature so as to make stabilization of the processing difficult. In accordance with the present invention, with the structural arrangement as defined, the depositing of products on the wall of the etching chamber is controlled by controlling the temperature of the wall within a predetermined temperature range so that the products are firmly deposited and interaction between the plasma and the wall surface is suppressed so as to stabilize the process without peeling off of the deposited products. Such features are not disclosed or taught in the cited art.

With respect to Goto et al, applicants submit that there is no disclosure or teaching of having the sidewall which forms a part of the etching chamber being grounded to earth, nor that a detachable member is held against the sidewall and removable therefrom through which a heat conductive medium is circulated with products formed in the etching chamber being deposited on the detachable member.

While the Examiner refers to Goto et al as disclosing a sidewall and a jacket including heat exchange water jackets which are held inside of said sidewall, applicants note that col. 8, lines 20-42, referred to by the Examiner, indicates that electric heaters and/or heat exchange water jackets are "buried in the chamber walls between their inner and outer surfaces". That is, such members are disposed within the wall of the chamber 105 between inner and outer surfaces of the chamber 105 and such description in Goto et al does not disclose or teach a detachable member being detachably held on the sidewall inside of the etching chamber and forming an

inner surface of the etching chamber which is in contact with the plasma generated in the etching chamber with the detachable member being removable from the sidewall to outside of the etching chamber and in which the sidewall is grounded to earth. Additionally, there is no disclosure or teaching in Goto et al of products being formed in the etching chamber being deposited on the detachable member with a thermally conducted medium being circulated inside of the detachable member. As such, applicants submit that all claims patentably distinguish over Goto et al in the sense of 35 U.S.C. 103.

With respect to Hanaguri, applicants submit that the Examiner has mischaracterized the disclosure of this reference, and applicants note that Hanaguri is directed to a film formation device and does not disclose an etching chamber, wherein plasma etching of the sample is effected as recited in the claims of this application. Moreover, in Hanaguri, what the Examiner refers to as a jacket 5 which is held inside of the sidewall 2 is described in Hanaguri as an inner chamber which is an operative chamber of the vacuum film formation device and is disposed within an outer chamber and which is provided with a cooling mechanism in the form of a cooling tube which surrounds the box-shaped outer circumferential plane of the inner chamber. Applicants note that Hanaguri does not disclose that the outer chamber is grounded to earth nor that a detachable member is held against the sidewall inside of the etching chamber and forming an inner surface of the etching chamber which is in contact with the plasma generated in the etching chamber and that products formed in the etching chamber are deposited on the detachable member. Also, applicants submit that there is no disclosure or teaching in Hanaguri of a detachable member which is removable from the sidewall to outside of the etching chamber, nor that a thermally conductive medium is circulated in the inside of the detachable member which is held against the sidewall during etching. Accordingly, applicants

submit that Hanaguri taken in combination with Goto et al fails to provide the claimed features as set forth in claim 52 and the dependent claims of this application.

With respect to Shinji, applicants note that this reference discloses an inner protection wall member 12 and a sidewall 1 disposed with a gap therebetween, and a gas conducting heat transfer being supplied to the gap to cool the inner protection wall member 12 which provides for increase of the amount of heat transfer from the inside to the outside of the processing chamber to provide cooling of the surface of the inner protection wall. Shinji like Goto et al fails to provide a detachable member held against the sidewall of the etching chamber and forming an inner surface of the etching chamber through which a thermally conductive medium circulates.

Accordingly, in Shinji, the temperature of the inner protection wall undergoes fluctuation by the heat of the plasma formed in the processing chamber and suffers from destabilization of the process in that polymer deposited on the wall tends to peel off as a result of the temperature change. Applicants submit that although Shinji may be considered to disclose a sidewall being grounded to earth, the inner protection wall member 12 is not held against the sidewall 1 in light of the spacing and Shinji also fails to disclose the other features as recited in claim 52 and the dependent claims. Thus, applicants submit that Shinji taken alone or in combination with Goto et al fails to provide the claimed features of claim 52 and the dependent claims, and all claims patentably distinguish thereover in the sense of 35 U.S.C. 103 and should be considered allowable thereover.

With respect to Shinichiro, applicants submit that this reference also fails to disclose or teach the claimed features herein of a sidewall which is grounded to earth and a detachable member held against the sidewall and through which a thermally conductive medium is circulated as recited in claim 52 and the dependent claims. Thus, hereagain, any combination of Shinichiro with the other cited art fails

to provide the recited features of claim 52 and the dependent claims in the sense of 35 U.S.C. 103, such that all claims should be considered allowable.

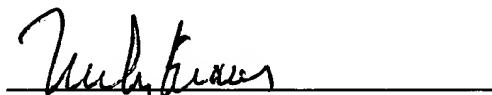
As to the dependent claims, applicants submit that such claims recite further features not disclosed or taught in the cited art irrespective of the Examiner's contentions with regard thereto, and when considered in conjunction with the parent claims, further patentably distinguish over the cited art in the sense of 35 U.S.C. 103.

In view of the above amendments and remarks, applicants submit that claims 52-61 should be in condition for allowance and issuance of an action of a favorable nature is courteously solicited.

Also submitted herewith is an Information Disclosure Statement.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (520.34403CV4) and please credit any excess fees to such deposit account.

Respectfully submitted,



Melvin Kraus
Registration No. 22,466
ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee
(703) 312-6600

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 1, please amend the paragraph beginning at line 3 as follows:

CROSS REFERENCE TO RELATED APPLICATION

This is a divisional application of U.S. application Serial No. ~~09,227,332~~
09/227,332, filed January 8, 1999, now U.S. Patent No. 6,171,438, which is a
continuation-in-part of to U.S. application Serial No. 08/611,758, entitled "Plasma
Processing Apparatus and Plasma Processing Method", filed March 8, 1996, now U.S.
Patent No. 5,874,012, by some of the inventors herein, the subject matter of the
aforementioned application being incorporated by reference herein and copending with
related application U.S. application Serial No. 09/421,044, filed October 20, 1999.